CLAIMS

What is claimed is:

1. An isolated biomarker comprising 51% or more genes selected from the group consisting of the nucleic acids identified in Figures 1, 3, 5, 6a and 7a.

2. An isolated biomarker comprising two or more genes selected from the group consisting of the nucleic acids identified in Figures 1, 3, 5, 6a and 7a.

3. An isolated biomarker consisting essentially of the nucleic acids identified in Figures 1, 3, 5, 6a and 7a.

4. An isolated biomarker comprising 51% or more genes selected from the group consisting of the nucleic acids identified in Figures 6b.

5. An isolated biomarker comprising two or more genes selected from the group consisting of the nucleic acids identified in Figures 6b.

6. An isolated biomarker consisting essentially of the nucleic acids identified in Figures 6b.

7. An isolated biomarker comprising 51% or more genes selected from the group consisting of the nucleic acids identified in Figures 6c.

8. An isolated biomarker comprising two or more genes selected from the group consisting of the nucleic acids identified in Figures 6c.

9. An isolated biomarker consisting essentially of the nucleic acids identified in Figures 6c.

10. An isolated biomarker comprising 51% or more genes selected from the group consisting of the nucleic acids identified in Figures 2, 4, 5, 6d and 7b.

11. An isolated biomarker comprising two or more genes selected from the group consisting of the nucleic acids identified in Figures 2, 4, 5, 6d and 7b.

12. An isolated biomarker consisting essentially of the nucleic acids identified in Figures 2, 4, 5, 6d and 7b.

13. A method of diagnosing mild osteoarthritis in an individual, comprising determining the level of expression of a biomarker in a sample wherein said biomarker comprises one or more polynucleotide sequences selected from the group consisting of the nucleic acids identified in Figures 1, 3, 5, 6a, 7a , whereby a difference in said level of expression of said biomarker compared to a biomarker control is indicative or predictive of mild osteoarthritis.

14. The method of claim 13, wherein said polynucleotide sequences are from the 5' region of a gene selected from the group consisting of the nucleic acids identified in Figures 1, 3, 5, 6a, 7a.

15. The method of claim 13, wherein said polynucleotide sequences are from the 3' region of a gene selected from the group consisting of the nucleic acids identified in Figures 1, 3, 5, 6a, 7a.

16. The method of claim 13, wherein said polynucleotide sequences are from the internal coding region of a gene selected from the group consisting of the nucleic acids identified in Figures 1, 3, 5, 6a, 7a.

17. A method of diagnosing severe osteoarthritis in an individual, comprising determining the level of expression of a biomarker in a sample wherein said biomarker comprises one or more polynucleotide sequences selected from the group consisting of the nucleic acids identified in Figures 2, 4, 5, 6d, 7b whereby a difference in said level of expression of said biomarker compared to a biomarker control is indicative or predictive of severe osteoarthritis.

18. The method of claim 17, wherein said polynucleotide sequences are from the 5' region of a gene selected from the group consisting of the nucleic acids identified in Figures 2, 4, 5, 6d, 7b.

19. The method of claim 17, wherein said polynucleotide sequences are from the 3' region of a gene selected from the group consisting of the nucleic acids identified in Figures 2, 4, 5, 6d, 7b.

20. The method of claim 17, wherein said polynucleotide sequences are from the internal coding region of a gene selected from the group consisting of the nucleic acids identified in Figures 2, 4, 5, 6d, 7b.

21. A method of diagnosing moderate osteoarthritis in an individual, comprising determining the level of expression of a biomarker in a sample wherein said biomarker comprises one or more polynucleotide sequences selected from the group consisting of the nucleic acids identified in Figures 6b, whereby a difference in said level of expression of said biomarker compared to a biomarker control is indicative or predictive of moderate osteoarthritis.

22. The method of claim 21, wherein said polynucleotide sequences are from the 5' region of a gene selected from the group consisting of the nucleic acids identified in Figures 6b.

23. The method of claim 21, wherein said polynucleotide sequences are from the 3' region of a gene selected from the group consisting of the nucleic acids identified in Figures 6b.

24. The method of claim 21, wherein said polynucleotide sequences are from the internal coding region of a gene selected from the group consisting of the nucleic acids identified in Figures 6b.

25. A method of diagnosing marked osteoarthritis in an individual, comprising determining the level of expression of a biomarker in a sample wherein said biomarker comprises one or more polynucleotide sequences selected from the group consisting of the nucleic acids identified in Figures 6c, whereby a difference in said level of expression of said biomarker compared to a biomarker control is indicative or predictive of marked osteoarthritis.

26. The method of claim 25, wherein said polynucleotide sequences are from the 5' region of a gene selected from the group consisting of the nucleic acids identified in Figures 6c.

27. The method of claim 25, wherein said polynucleotide sequences are from the 3' region of a gene selected from the group consisting of the nucleic acids identified in Figures 6c.

28. The method of claim 25, wherein said polynucleotide sequences are from the internal coding region of a gene selected from the group consisting of the nucleic acids identified in Figures 6c.

29. A method for monitoring efficacy of a drug for treatment of mild osteoarthritis in a patient, comprising the steps of:

(a) obtaining a sample from a patient before treatment and a second sample from said patient after said treatment;

(b) detecting the level of expression of the isolated biomarker of claim 2 in said first sample and said second sample; and

(c) determining a difference in said level of expression of said biomarker in said first sample as compared with said second sample, wherein said difference is indicative of the efficacy of said drug for said treatment of mild osteoarthritis in said patient.

30. A method for monitoring efficacy of a drug for treatment of moderate osteoarthritis in a patient, comprising the steps of:

(a) obtaining a sample from a patient before treatment and a second sample from said patient after said treatment;

(b) detecting the level of expression of the isolated biomarker of claim 5 in said first sample and said second sample; and

(c) determining a difference in said level of expression of said biomarker in said first sample as compared with said second sample, wherein said difference is indicative of the efficacy of said drug for said treatment of moderate osteoarthritis in said patient.

31. A method for monitoring efficacy of a drug for treatment of marked osteoarthritis in a patient, comprising the steps of:

(a) obtaining a sample from a patient before treatment and a second sample from said patient after said treatment;

(b) detecting the level of expression of the isolated biomarker of claim 8 in said first sample and said second sample; and

determining a difference in said level of expression of said biomarker in said first sample as compared with said second sample, wherein said difference is indicative of the efficacy of said drug for said treatment of marked osteoarthritis in said patient.

32. A method for monitoring efficacy of a drug for treatment of severe osteoarthritis in a patient, comprising the steps of:

(a) obtaining a sample from a patient before treatment and a second sample from said patient after said treatment;

(b) detecting the level of expression of the isolated biomarker of claim 11 in said first sample and said second sample; and

(c) determining a difference in said level of expression of said biomarker in said first sample as compared with said second sample, wherein said difference is indicative of the efficacy of said drug for said treatment of severe osteoarthritis in said patient.

33. A method of identifying a therapeutic agent for the treatment of osteoarthritis, said method comprising:

a) providing a sample from a patient diagnosed with osteoarthrtis;

b) measuring the level of expression of a biomarker as set out in Figures 1 - 7 in the presence and the absence of said therapeutic agent; and

c) comparing said level of expression measured in the presence of said therapeutic agent to said level of expression measured in the absence of said therapeutic agent, wherein a decrease in the differential expression of said biomarker is indicative of a therapeutic agent for the treatment of osteoarthritis.

34. The methods of claims 13, 17, 21, 25, 29, 30, 31, 32 or 33 wherein said sample is human cartilage.

35. The methods of claims 13, 17, 21, 25, 29, 30, 31, 32 or 33,wherein said biomarker is immobilized to a microarray.

36. The methods of claims 13, 17, 21, 25, 29, 30, 31, 32 or 33, wherein said level of expression of said biomarker is determined by hybridization to a microarray or real time RT-PCR.